Proceeding International Conference of Innovation Science, Technology, Education, Children and Health
Voume 4 Number 2 Year 2024
e-ISSN : 2776-9062, page 300-305
Available online at: https://icistech.org/index.php/icistech

Development of a 3D Augmented Reality Quizizz Learning Media Prototype in Implementing the Independent Learning Management in Schools

Mesterjon[1]*, Suwarni[2], Khairil[3], Roy Syahputra[4], David Alvindo[5]
[1-3] Lecturer Dehasen University Bengkulu Indonesia
[4,5] Student Dehasen University Bengkulu, Indonesia
mesterjon07@gmail.com [1*]

Address: Jl. Meranti No.32, Sawah Lebar, Kec. Ratu Agung, Bengkulu City, Bengkulu 38228
Author correspondence: mesterjon07@gmail.com

Abstract. *This study aims to develop a learning media prototype based on the Quizizz application, combined with 3D Augmented Reality (AR) technology, to support the implementation of Merdeka Belajar management in schools. AR technology enables the integration of virtual objects into real-world environments in real time, creating an interactive and engaging learning experience for students. Validation tests conducted at SMK N 03 Kota Bengkulu revealed that students experienced enjoyable and interactive learning, especially in the hardware introduction subject for the Computer and Network Engineering (TKJ) program. This prototype also supports teachers and educational institutions in implementing the Merdeka Belajar curriculum and can be used by parents and students as a learning aid at home. Furthermore, test results indicate that this media can serve as a supportive tool for the Merdeka Belajar Kampus Merdeka (MBKM) program. This prototype holds significant commercial potential through subscription or licensing models for schools and educational institutions, along with AR content that can be tailored to specific curriculum needs. The key advantages of this innovation include interactivity, support for learning flexibility, integration of cutting-edge technology, and accessibility through common devices like smartphones and tablets. The development stages include research and development, prototype creation, testing, product launch, as well as ongoing maintenance and feature enhancement.*

Keywords : *Augmented Reality, Quizizz, Merdeka Belajar, Interactive, Learning Media, Prototype, School*

1. INTRODUCTION

Advancements in educational technology increasingly enable the application of more interactive and innovative teaching methods. One of the rapidly developing technologies in education is Augmented Reality (AR), which can provide three-dimensional (3D) visual experiences and deeper interactivity for students. By merging digital content with the real-world environment, AR facilitates immersive learning experiences that can make abstract concepts more tangible and engaging (Mesterjon et al., 2024). The implementation of the Merdeka Learning concept in Indonesia emphasizes the importance of flexibility in student-centered learning. Merdeka Learning prioritizes freedom for educators and learners to adapt teaching and learning activities to suit diverse needs, aspirations, and abilities. This flexibility encourages the integration of advanced technologies like AR into learning environments, fostering an engaging and adaptive educational experience (Mesterjon, Suwarni, & Selviani, 2022). Quizizz, a popular platform for creating and conducting quizzes, has gained attention as an effective digital learning tool. Its gamified approach to assessment promotes active

Received: November 23, 2024; Revised: December 07, 2024; Accepted: December 21, 2024; Published: December 23, 2024;

participation and enhances students' interest in learning (Mesterjon, Rulismi, & Dali, 2024). However, combining Quizizz with 3D AR technology could further transform the learning process by making assessments more interactive and visually appealing. This research focuses on developing a Quizizz-based learning media prototype using 3D AR technology and evaluating its performance in terms of: 1). Alignment with the curriculum: Ensuring the content adheres to learning objectives and standards, 2). Visual quality: Delivering clear and aesthetically pleasing 3D AR elements to enrich the learning experience, 3). Interactivity: Creating engaging tasks that encourage active student participation, 4). Ease of use: Providing a user-friendly interface for both educators and learners (Mesterjon, 2016) and 5). Relevance to the Merdeka Learning concept: Supporting flexibility and personalization in learning. The outcomes of this research are expected to offer a solution for enhancing student engagement, supporting individualized learning paths, and providing a more dynamic educational environment. This initiative aligns with the broader goal of integrating Technology 4.0 into education, thereby equipping students with the skills and knowledge needed to thrive in the digital era (Mesterjon et al., 2023).

2. METHODS

This research employs a prototype development and evaluation method. The learning media prototype is developed using 3D AR technology integrated with the Quizizz platform. Once the prototype is completed, trials are conducted with user groups including students, teachers, and parents. Assessment is based on:

a. Material Appropriateness with Curriculum: Alignment of content with applicable curriculum.
b. Visual Quality and AR Interactivity: The ability of 3D AR visualization to facilitate understanding of abstract concepts.
c. Interactivity and Student Engagement: The level of student engagement in learning using the available features.
d. Ease of Use (User-Friendliness): The degree of ease of use for students and teachers.
e. Relevance to the Merdeka Learning Concept: The media's ability to provide learning flexibility according to the principles of Merdeka Learning.

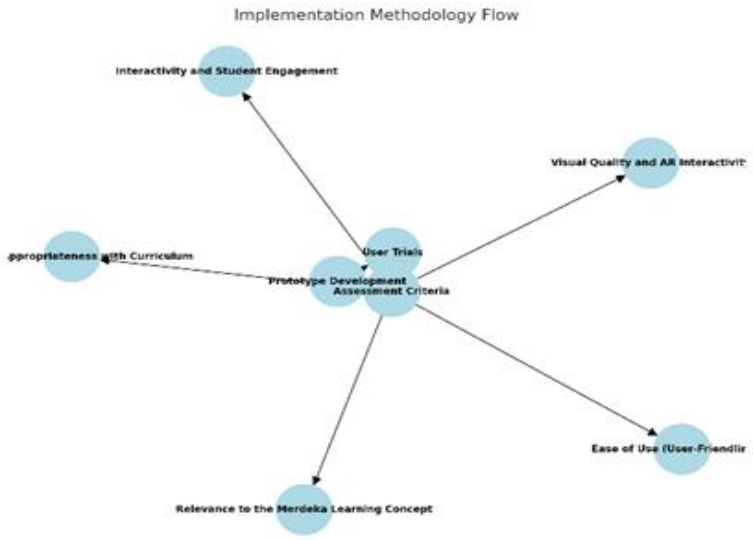

Figure 1 Implementation methodology Flow

3. RESULTS AND DISCUSSION

a. Material Appropriateness with Curriculum: The trial shows that the prototype receives a "Fairly Appropriate" rating concerning the applicable curriculum. Most content is relevant, although some topics need refinement for deeper exploration, especially for abstract material (Setiawan, 2024).

b. Visual Quality and AR Interactivity: The quality of 3D AR visualization is rated "Excellent," assisting students in understanding difficult concepts. AR technology allows students to observe objects in 3D form, making abstract concepts more concrete and easier to comprehend. Further optimization of graphics is still needed to maintain display quality on devices with lower specifications (Calvin, 2024; Wiawan, 2024).

c. Interactivity and Student Engagement: The 3D AR Quizizz media significantly enhances student engagement. Interactive features have proven effective in capturing students' attention and motivating them in the learning process. However, it is recommended to add gamification features to further increase learning motivation (Maharani, 2024; Yanto, 2024).

d. Ease of Use (User-Friendliness): This media is rated "Accessible" by students and teachers due to its intuitive interface. The provided user guides effectively facilitate understanding for new users. For a better experience, adding short tutorials within the application is recommended (Andika, 2024; Waruwu, 2024).

e. Relevance to the Merdeka Learning Concept: This media supports the Merdeka Learning concept by offering students the flexibility to choose learning methods that

align with their interests and abilities. Users can access various learning topics and adjust their learning pace according to individual needs (Sendayu, 2024; Yanto, 2024).

f. Benefits for Teachers and Educators: This media helps teachers deliver material more effectively by utilizing AR visualization, particularly for explaining complex concepts. The development of a more comprehensive student progress reporting feature is recommended to allow teachers to monitor student development more accurately (Calvin, 2024).

g. Potential for Wide Implementation: Assessments indicate that this media has the potential to be widely implemented across various educational levels, from elementary schools to higher education institutions. The platform's flexibility allows it to be adapted to different curricula, enhancing its reach for various educational institutions interested in adopting AR technology in learning (Setiawan, 2024; Andika, 2024).

4. CONCLUSION

The development of Quizizz-based AR 3D learning media successfully enhances the quality and effectiveness of learning, supporting the application of Merdeka Learning principles with high flexibility and strong relevance to the curriculum. This media effectively improves interactivity and student motivation, particularly in understanding abstract concepts, through innovative 3D visualization techniques (D. Setiawan, 2024; P. Maharani, 2024; M. Wiawan, 2024). Additionally, it offers significant potential for wider implementation in educational programs, including the Teaching Campus and Merdeka Learning Campus Merdeka (MBKM) initiatives (D.S. Waruwu, 2024; S. Yanto, 2024). The adaptability of this media to various educational levels and curricula demonstrates its flexibility as a modern educational tool. While the current prototype showcases considerable success, further development is recommended. Key areas for improvement include the addition of gamification features to enhance student engagement (Calvin, 2024a; Calvin, 2024b), optimization of software performance to ensure compatibility across a broader range of devices (S. Andika, 2024), and the enrichment of content to cater to diverse curricula (Sendayu, 2024). Such advancements will further align the media with the evolving needs of educat

Key Takeaway from the Text: The development of Quizizz-based AR 3D learning media has successfully enhanced the quality and effectiveness of learning, particularly in supporting the principles of Merdeka Learning. This media provides innovative 3D visualization techniques that improve students' understanding of abstract concepts, boost interactivity, and increase motivation. Its flexibility allows adaptation across various educational levels and

curricula, making it a valuable tool for programs like Teaching Campus and the Merdeka Learning Campus (MBKM) initiative. While the initial prototype has shown promising results, further development is necessary to enhance student engagement through gamification features, optimize software performance for compatibility with a broader range of devices, and enrich the content to align with diverse curricula. These advancements are critical to ensuring the media continues to meet the evolving needs of modern education. Development Recommendations

a. Enhancement of Content and Interactive Features: It is recommended to add more concrete topics and varied gamification features to increase student engagement.
b. Optimization of Software Performance: Performance improvements are necessary, especially for devices with lower specifications to ensure optimal rendering and responsiveness of the application.
c. Adjustment for Various Curricula: Future development should include support for other curricula and customization features tailored to the needs of students and teachers.
d. Comprehensive User Guides: Providing additional guides and short tutorials will assist new users in understanding this technology and maximizing the media's functions.

With ongoing development, this Quizizz-based 3D AR learning media has great potential for wide adoption in a more inclusive and interactive educational environment.

REFERENCES

Calvin, "3D AR Quizizz Graphic Design Test Results Sheet (Media Expert)," CL.00.005, September 30, 2024.

Calvin, "AR Development Test Results Sheet," CL.00.004, September 26, 2024.

D. Mesterjon, S. Suwarni, and D. Selviani, "Projects-Based Learning Model to Increase Results and Student Activities," Tech. Soc. Sci. J., vol. 9, p. 114, 2020.

D. Rulismi, M. Mesterjon, and S. Hamzah, "The Development of a School Principal Leadership Model Oriented Towards Professional Performance," in International Conference on Science, Education, and Technology, 2023, pp. 198–201.

D. Setiawan, "Quizizz 3D AR Media Test Results Sheet," CL.00.001, September 20, 2024.

D.S. Waruwu, "Content Development and Integration Test Results Sheet," CL.00.007, October 4, 2024.

M. Mesterjon and D. Rulismi, "Evaluation of Demonstration Learning Models in Improving Vocational Student Learning Outcomes," 2023.

M. Mesterjon, "Analysis of Academic Achievement of Graduates from XYZ University in

Relation to Career Alignment," in Innovare Journal of Education (IJOE), 2024, pp. 17-21.

M. Mesterjon, "Computer Hardware Teaching Media Application Based on 3D Augmented Reality with Android Operating System," in International Journal of Computer Science Trends and Technology, 2016, pp. 2347-8578.

M. Mesterjon, D. Rulismi, A. Sahil, and Z. Dali, "Effectiveness of the Use of Quizizz Media on Students' Learning Interest," Futur. Educ., vol. 4, no. 2, pp. 245–262, 2024.

M. Mesterjon, D. Rulismi, and J. Sapri, "Analysis of Blended Learning Models Using Technology 4.0 to Improve Critical Thinking Skills," Budapest Int. Res. Critics Linguist. Educ. J., vol. 6, no. 2, pp. 183–196, 2023.

M. Mesterjon, S. Suwarni, and D. Selviani, "Analysis of Industrial Revolution 4.0 Technology-Based Learning in Higher Education," AL-ISHLAH J. Pendidik., vol. 14, no. 4, pp. 5627–5636, 2022.

M. Mesterjon, S. Suwarni, D. Rulismi, and S. Danim, "Evaluation Study of the Use of Interactive Multimedia 4.0-Based Teaching Materials," Budapest Int. Res. Critics Institute-Journal, vol. 6, no. 2, pp. 697–703, 2023.

M. Mesterjon, S. Suwarni, D. Selviani, and S. Monang, "Analysis of Learning System in Higher Education through a Technology 4.0 Approach in the Era of COVID-19 Pandemic," J. Innov. Educ. Cult. Res., vol. 3, no. 3, pp. 355–360, 2022.

M. Wiawan, "3D AR Software Test Results Sheet (Media Expert)," CL.00.003, September 25, 2024.

Mesterjon et al., "Management of Improving Student Learning Outcomes Through 4.0 Learning Media," American Journal of Science Education Research, p. 162, 2024.

P. Maharani, "Input Data Processing Test Results Sheet for Quizizz Media," CL.00.002, September 23, 2024.

S. Andika, "Hardware and Software Installation and Configuration Test Results Sheet (Internal Trial)," CL.00.006, October 2, 2024.

S. Yanto, "Quizizz 3D AR Validation/Test Results Sheet," CL.00.009, October 12, 2024.

Sendayu, "Sample Analysis Test Results Sheet," CL.00.008, October 8, 2024.